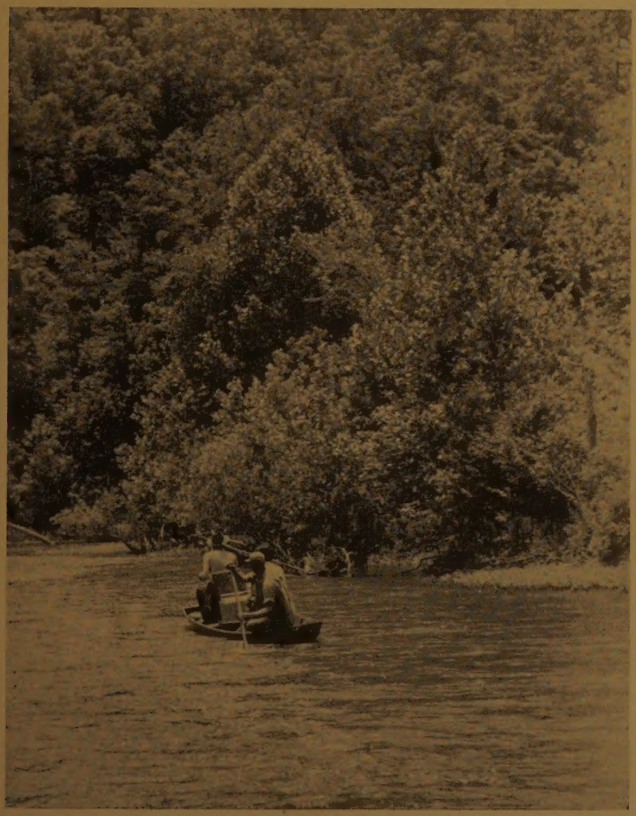
MISSOURI BOTANICAL GARDEN BULLETIN



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lume XLIV November, 1956 Number 9

COVER:—Swift rapid or gravel run leads down into a long deep pool. At Jack's Fork. Photo by Leonard Hall.

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Missouri Botanical Garden Bulletin

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THE OZARKS COME BACK

(Continued from January, 1956 BULLETIN)

LEONARD HALL, Possum Trot Farm

ONE of the great problems we face in bringing about total rehabilitation of the forested lands of the Ozarks and in putting them into profitable sustained-yield production has to do with open range grazing. This is the custom, sanctioned by law in the open range counties, of allowing any farmer to turn out his cattle, hogs, horses, mules and goats to forage on forested land which is not only privately owned but belongs to some one else. The custom dates back, of course, to a day when most wild land had not been taken up by private owners. Because it enables the small marginal farmer to run many more animals than his own deeded land can support, the custom dies hard.

There are many reasons why open range grazing, which almost always means over-grazing, is destructive. The one most often noted is that it causes great damage to young trees, practically eliminating all tree reproduction. But there are other reasons equally important, and some of these are sociological and physiological. Open range grazing breeds a kind of lawlessness by the very fact of sanctioning by law the right of a minority group to exploit for profit the property of another group who is denied redress for damages sustained. It encourages sub-marginal farming and sub-marginal living in many Ozark counties. It goes hand-in-hand with incendiary fire-setting ("we burn to make the grass grow"), and the fires inhibit tree reproduction, damage the growing and mature timber, cause erosion, and destroy wildlife.

These are the facts about open range grazing—although they do not mean that a good many responsible and respectable citizens do not also use the open range. Many Ozark counties, however, have already found it profitable to pass county-wide stock laws which eliminate open range grazing entirely. Others have started to close the range, one township at a time. But in the counties with the largest forest acreage and the fewest agricultural resources, stock laws go down to defeat in every election, despite the fact that

potential forest income is far greater than the actual livestock income. The answer to the problem is probably a state-wide law which will come into being when enough people have been killed by running into livestock on Ozark highways.

In our Missouri national forests, the Forest Service has instituted a control program in most areas where grazing pressure was excessive. As a result of this program the actual amount of good forest grazing, measured in pounds of meat per section of land per year, has increased. Timber reproduction and growth have improved. Wildlife populations have made a tremendous recovery. Finally, by means of a program encouraging farmers to improve their home pastures and hay lands, agricultural income in areas contiguous to the forest has probably been increased—while many poor, sub-marginal holdings have been closed out to the benefit of all concerned.

Most of the steps which make for better forest management—especially control of fire and grazing and improvement of timber stand—are also beneficial to wildlife. And, fortunately for the people of Missouri and for the flora and fauna involved, both the U. S. Forest Service and our own Conservation Commission have had wildlife as a primary interest. Thus in the early days of the program, back in the mid-1930's, cooperative wildlife refuges were set aside in our national forests in an effort to increase the numbers of whitetail deer, wild turkey and other birds, and small mammals. In these refuges the Forest Service worked to manage and improve the land as a habitat for wildlife, while the Conservation Commission assumed responsibility for protection and management of the wildlife itself.

Many things have followed from this small beginning; and as more and more forest land in the state comes under good management, the area which will support wildlife populations increases steadily. Most spectacular of all has been the come-back of the whitetail deer. Back in 1934 when Drs. Bennitt and Nagel made their survey of the "Resident Game and Furbearers of Missouri" it was estimated that no more than about 2500 deer remained in the state. Today deer are reported from every county right up to the Iowa line, and, with perhaps 200,000 deer in the herd, the problem is becoming one of keeping them in balance with the available supplies of food and cover.

Other wildlife species have benefitted from the forest program. On many streams today, good numbers of beaver are reported. Wild turkeys, which seemed on the way to certain extinction, are at least holding their own, and one 25,000-acre refuge is devoted largely to increasing their numbers. In the improved areas of forest land, at least, there have also been substantial increases in the number of racoons, squirrels and other mammals —and even of Bobwhite quail.

One important result of better forest management is adequate protection for the watersheds of the Ozark area. Under the old conditions of over-cutting and over-grazing, annual burn-

(Photo by Missouri Conservation Commission)

ing and general misuse, the condition of the forest soils went steadily downhill. The soils became tightly compacted and the lack of humus allowed the normally thin topsoil to wash away. There were few soil micro-organisms left to keep the land "alive." The rains as they fell could no longer infiltrate these impervious soils and so ran off down the hollows, carrying their load of gravel and silt. Growth of trees and all other plants was slowed by lack of water and the nutrients normally built up in a good forest soil. Tests by the Forest Service showed that even where the water was held on the land and could not run off, up to three hours might be required for a two-inch rain to soak in. This meant a serious lowering of the forest water table and the gradual depletion of the great reservoirs of ground water which pour into our springs and streams.

The first step in getting the forest "water works" to function again is to build up the humus layer by preventing fires. Second is the elimination of grazing to promote the growth of the forest under-story which consists of many shrubs, grasses, legumes and other small flowering plants. At this point the soil organisms begin to increase and the land comes alive again. The third step is to improve the stand of trees by girdling the old cull trees and by cutting out the brushy-type trees (which are thickly entangled, the older growth usually dead and not adding to the annual deposit of humus) thus increasing the deposit of organic matter and, at the same time, releasing quantities of plant nutrients for use by the remaining trees. When these steps have been taken, we find that we have increased tremendously the infiltration of rainfall into the forest floor, thus hold-

ing surface run-off to a fraction of what it was. The soil which formerly took two hours to absorb two inches of water will now take up this amount in two minutes or even less.

When the measures here described are applied to an entire forest watershed, we can predict many of the interesting things which happen. First of all, forest tree growth on areas where the stand has been improved makes a big spurt. As an example the following case can be cited, although it may not be entirely typical. Recently we saw in the office of Pioneer Forest at Salem a cross-section of a 90-year-old pine tree taken from an area where a release cutting (the removal of old and dead trees and clearing of underbrush) had been made eight years previously. Judging from the rings, in the eight years following the release cutting the growth was almost equal, in terms of diameter, to that in the preceding 80 years—which means a greater increase in volume of lumber in the tree.

As might be expected, with the build-up of humus on the forest floor, less and less water is lost by overland flow following a rain. It is disposed of, instead, by evaporation, subsurface absorption, and transpiration by plants. And as this water moves through the soil and subsoil, instead of over the surface, streams in the watershed are no longer subject to sudden flash floods; instead, they flow clear and with only moderate rises, even in periods of heavy rainfall Moreover, stream-flow is more even throughout the year, peaks after rain are not as great, nor are the lows as severe in time of drought. The reason for this is that water stored in underground reservoirs and in the upper soil filters out into the stream channels more slowly and at a fairly even rate.

There are interesting secondary results from this improvement in the forest "water works." As erosion is checked, less gravel is carried downhill into the streams and they begin to stabilize. More cover grows along the banks and on the gravel and sand-bars which have built up through the years of misuse; and this in itself helps check the damaging effect of future floods. More aquatic plants appear in the streams and are not scoured out by recurring high waters. These plants are at the base of the food chains in the stream, encouraging the growth of plankton, small crustaceans and other life forms which in turn furnish food for the forage fishes such as minnows; and thus the pyramid builds up through the sunfish and goggle-eye to such higher forms as wall-eyed pike and bass. Thus even the fisherman benefits from better forest management.

The botanist also finds interesting material for study in this new forest. For now the plant successions which might have been expected in the over-grazed, over-cut and over-burned timberland no longer take place. New species—or at least species which have long been absent—begin to appear. Perennial grasses such as bluestem and Indian grass take the place of annual cheat and poverty grass, and these are fertilized by native legumes of which there are a dozen or more. Shrubs appear in the forest understory which are

The house at Possum Trot looks across a wooded valley.
Cedar and White Oak like limestone soil.

(Photo by Leonard Hall)

Big Springs

(Photo by Rex Gary)

not detrimental to tree growth and which furnish food for deer and other forms of wildlife. It would be interesting to botanize some of these improved forest stands after twenty years of good management, making the logical projection into the future; and then to compare the record with studies made when the same areas were on the way downhill.

All in all we've made progress in the Ozarks during the past two decades; yet a lot remains to be done. Roughly, it might be said that the 10 per cent of land now held by such public agencies as the State and Federal governments is 90 per cent well managed; the approximately 15 per cent held in corporate and large private ownership is about 50 per cent well managed; and the remaining 75 per cent which is in small private holdings and farm woodlots is perhaps 90 per cent badly managed if it is managed at all. Yet we should not conclude from this that the case is hopeless, for there was a time when *all* forest land capable of being exploited was mismanaged; and there is evidence today that for the first time in the past 100 years, timber growth has caught up with timber use in the nation as a whole.

What really good forest management can mean to the Ozarks and their future was revealed dramatically in a study in which I participated not long

ago. Working with competent foresters, we selected a county in which about 85 per cent of all land is classed as timber land, in which tax revenue is so low as to constitute a real problem, and in which the population is declining because of lack of economic opportunity. An analysis was made of increased growth and current yields from National Forest acreage in the county after 15 years of good management, and the future sustained yields when the maximum growth rate has been reached was estimated. Briefly, it was determined that if this growth rate and yield could be duplicated on all forest land in the county, the labor of some 1200 additional families would be required to handle just the initial processing of forest products; that is, the felling of trees, hauling, and rough milling. Value of rough milled lumber alone would add $3,000,000 to the annual income of the county, while value of forest lands for tax purposes would show a substantial increase. Moreover, if processing were carried a single step further—by turning rough oak boards into oak flooring, for example—both number of workers required and additional income for the county would increase accordingly.

While this study was made for a single county, the facts apply to practically every county in the forested area of the Missouri Ozarks. And while progress comes slowly—still it comes surely. In the forests of the Ozarks conditions generally are far better than they were twenty or even ten years ago. Thus it seems reasonable to say, as we did last January, in the first article of this series, that "today the Ozarks is once again a land of hope and restoration where residents look forward with confidence to a better future."

THE CHRYSANTHEMUM SHOW

THE Fall and Winter shows at the Garden will cover longer periods and occupy more greenhouse space this year than ever before. The early chrysanthemums, featuring a fine exhibit by the St. Louis Chrysanthemum Society, went on display the last week in October, along with fall-blooming orchids, principally Baby Moth *(Dendrobium Phalaeonopsis)* and Bowringiana hybrid Cattleyas in variety. Later-flowering chrysanthemums were staged in the Linnaean House where they are already making a fine showing against the rich green background of the camellias and evergreen vines. In this cool greenhouse the last of them will stay until the camellias come into bloom, so that this beautiful old building will give the appearance of an old-fashioned flower garden in the deep South from November to March. The orchids will gradually be replaced by later-flowering varieties and Poinsettias will be on mass display during the Christmas holidays. During February and March the orchid exhibit will culminate in a special Golden Jubilee orchid show, honoring Mr. Pring's long connection with the orchid department.

RICE, NORTHWARD HO!

JULIAN A. STEYERMARK

RICE *(Oryza sativa)*, one of the world's most important food plants, is cultivated in warm countries at low altitudes where there is sufficient moisture present. India, China, Japan, Korea, Java, the Philippine Islands, and other oriental countries produce and use vast quantities of the grain. It is also grown and consumed in considerable amounts in parts of Africa and in South and Central America. In the United States the principal commercial rice-growing districts are in Texas, Louisiana, Arkansas, California, and North and South Carolina.

What is the story of rice in Missouri? In the boot-heel lowlands section of southeastern Missouri it is grown in very small quantities, although this corner of the state is where one would expect to find it, since its climatic range is similar to that of cotton. However, in September of 1956 I experienced quite a shock while driving along a stretch of highway in extreme northern Marion County between Taylor, Missouri, and Quincy, Illinois. For there, in the bottomland just east of the city limits of Taylor (about 25 miles northwest of Hannibal), I spotted numerous bright green clumps of a grass growing in a dried-up swale. It appeared unfamiliar at a distance, the fruiting sprays nodding gracefuliy above a leafy cluster of stems that was two to three feet high. Closer inspection of the plants at once revealed their identity as rice. But how unexpected, finding rice this far north in Missouri!

A check-up of this phenomenal occurrence of rice only 30 miles or so away from the Iowa line revealed some additional information regarding its distribution in that area. I was told by the local residents that rice was grown on a commercial scale just a few miles south of Taylor, in a section of the Mississippi River floodplain known as Mark Bottom, occupying hundreds of acres of fertile wet soil. This was news to me, and I was sure that it would be to many other Missourians. Apparently, the rice plants which I had found along the highway had become established from seed accidentally dropped here. It had germinated in the wet soil, and had grown into mature grain-producing plants. An interesting sidelight of this discovery was that, although several people in Taylor had seen rice growing in the extensive acreage under cultivation in Mark Bottom, none of them had realized that rice was growing so close by along the highway until I had called attention to it.

It should be pointed out that another kind of plant of the grass family, a species of wild rice, also called Water-Millet *(Zizaniopsis miliacea)*, occurs in the cypress swamps and drainage ditches of southeastern Missouri lowlands and in the sink-hole ponds (swampy remnants of the ancient peneplain of the Ozarks) of several southeastern Ozark counties. It occurs from Florida to Texas north to Maryland, Kentucky, southeastern Missouri, and Oklahoma, and extends south into Mexico and South America.

On the other hand, the Wild Rice of the northern states (*Zizania aquatica* with its several varieties), which was a staple food of northern tribes of American Indians, especially of the Great Lakes region, is occasionally found around borders of ponds and sloughs in parts of central and southeastern Missouri. It is often planted as a food for waterfowl. Although it can be purchased at many food stores, it commands a fairly high price, and for that reason is not used as frequently as the commonly cultivated *Oryza sativa*. However, it is becoming increasingly popular as a complement to turkey or other fowl served at Thanksgiving or Christmas dinner. Together with its varieties, *Zizania aquatica* ranges from portions of Canada and Nova Scotia south to Florida and west to Idaho, North Dakota, Nebraska, and Texas.

AN AFRICAN VIOLET SOCIETY IS BORN — THE AFRICAN VIOLET SOCIETY OF AMERICA, INC.

ADELE TRETTER

It is rather astounding to realize that a little house-plant such as the African Violet (known botanically as Saintpaulia) is responsible for a national plant society. Yet, when a small group of people presented the first African Violet show in Atlanta, Georgia, on November 8 and 9, 1946, the interest in an organized society was manifested first by the formation of the Atlanta African Violet Club; and, later, as a result of an extra meeting on the final day of the Show, in the organization of the African Violet Society of America. The Society was incorporated on June 30, 1947, and, since the number of members had increased so rapidly, the charter memberships were closed by July, 1947.

Under the editorial direction of Alma Wright, assisted by Mary Parker, the material for a bulletin was assembled and the *African Violet Magazine* was published in 1948 with a first issue of 500 copies. The Society held its first annual meeting in Atlanta in the Fall of 1947, with an accompanying African Violet Show, thus establishing the custom of presenting a large show with each annual meeting of the Society.

The object of the Society is to afford a beneficial association of persons interested in African Violets, to stimulate an interest in the propagation and culture of African Violets, to encourage the organization of new and improved varieties, and also to gather and publish reliable information concerning the culture and propagation of African Violets. There are six classes of membership: individual, commercial, research, sustaining, life, and honorary. There are now more than 328 affiliated chapters with a total membership of about 15,000; in addition, there are 123 commercial memberships. The Society now has clubs and members in other countries including Canada, Alaska, British Columbia, Africa, Nova Scotia, Cuba, Italy, Hawaii, Germany, Indo China, and England.

THE METROPOLITAN ST. LOUIS COUNCIL OF AFRICAN VIOLET CLUBS

ADELE TRETTER

The first African Violet Club in this locality (the "Webster Groves African Violet Society") was organized in January 1949 by a group of Webster Groves women who were interested in growing African Violets as a hobby. Through the influence of this club, more African Violet enthusiasts in St. Louis began grouping into organized societies; the earliest of which were the "Viking Club" (1949) and the "Normandy" (1951).

In the spring of 1952, these three clubs sponsored the first African Violet Show for the St. Louis vicinity with Mrs. Farris of Webster Groves as general chairman. The show was successful in further popularizing the African Violet and in stimulating the organization of five new clubs in St. Louis and St. Louis County—the "Ionantha", the "Greater St. Louis", the "Rainbow", the "Amethyst", and the "Holly"—all organized in 1952.

On February 3, 1953, the president and two representatives of each club met for the purpose of integrating the groups into a Council which was to have one general meeting and two board meetings each year. With the formation of the Council, Mrs. A. Zimmerman, of the Webster Groves group, was elected the first President. As one of its first functions the Council presented the second St. Louis African Violet Show April 18, 1953, under the chairmanship of Mrs. W. Mock of Webster Groves. The "County Bells" and the "Twilight" clubs were organized that same year. At the general Council Meeting, Mrs. Wayman of "Viking" was elected president for 1954.

When the "Evening Sunset" club organized in January, 1954, the total number of clubs in the Council was brought to eleven. The Council, with Mrs. Mock as chairman, was hostess to the National African Violet Society Convention and Show held at the Hotel Chase in April of 1954. Among the activities planned for the guests by the Council was a tour of St. Louis ending at the Missouri Botanical Garden where, following a guided tour of the Garden, tea was served at the Museum. At the 1954 General Council Meeting Mrs. Thelma Usinger of "Amethyst" was elected to succeed Mrs. Wayman. A twelfth club and the first to include husbands with their wives, the "Knights and Ladies", was formed in 1954.

Twelve clubs participated in the Third African Violet Show given in April of 1955 (the "Cinderella" club had been added and the "Evening Sunset" discontinued). In November Mrs. W. F. Anderson of "Viking" was elected by the Council to serve as president during 1956. At this meeting the "Normandy" and the "Ionantha" clubs agreed to unite to form the "Normandy-Ionantha Club". The Fourth Show was held at the Missouri Botanical Garden in April of 1956 with Mrs. Fred Tretter of "Greater St. Louis Club" chairman. The fifth

and most recent Council meeting, held in October, elected Mrs. Tretter to be the 1957 president.

Plans are being made for the fifth African Violet Show to be given in March of next year at the Missouri Botanical Garden. The Council, now consisting of ten clubs, is called the "Metropolitan St. Louis Council of African Violet Clubs" and it is affiliated with the AFRICAN VIOLET SOCIETY OF AMERICA, INC.

THE HENRY SHAW CHRISTMAS PARTY!

THIS year, as last, the Women's Committee of the Garden will stage a special Christmas Show in Mr. Shaw's Old Residence, "TOWER GROVE". The show, "Henry Shaw's Christmas Party", will be given under the chairmanship of Mrs. Martin Lammert III with Mrs. William Hedley and Mrs. Carroll Mastin as very active co-chairmen (since Mrs. Lammert is recovering from a serious injury). Plans are now being made, under the direction of Mrs. T. Randolph Potter and co-chairmen Mrs. Grant William and Mrs. Edward L. Bakewell, Jr., to create exciting room decorations. Every room of the handsome Shaw Residence will offer a spectacular Christmas theme, filled with ideas that will be easy and thrilling to adapt to one's own home. In the Museum building there will be a display featuring the botanical aspects of Christmas decorations, prepared by Dr. Cutler and his students in Economic Botany. Accompanying this exhibit will be "Sugar 'n Spice", a baked goods sale, with Mrs. J. J. Jannuzzo and Mrs. Steven J. Wolff as co-chairmen. The hostesses will be Mrs. George Pring and Mrs. Arthur J. Krueger. Other special committees and their chairmen are: General Arrangements, Mrs. Robert W. Otto and Mrs. Lewis B. Stuart; Publicity, Mrs. Rolla M. Horwitz; Music, Mrs. William P. Chrisler; Corsages, Mrs. E. J. Neuner; Christmas Treats, Mrs. Mary Baer; Ticket Sales (Federated Garden Clubs), Mrs. Frank Vesser—(Women's Committee and General Distribution), Mrs. Charles Rice with Mrs. Earl Hath and Mrs. P. H. Britt; Treasurer, Mrs. John R. Shepley.

The show will be open from Thursday, December 6th, through Sunday the 9th, from 11 in the morning until 7 in the evening. Admission will be one dollar for adults and fifty cents for children, and the entire proceeds will go to the Garden. Tickets are now available from members of the Women's Committee, at Lammert's Clayton Store and at the Main Gate House of the Garden. Checks should be made payable to Shaw's Garden and forwarded to Mrs. Charles M. Rice, #1 Oak Knoll, St. Louis 5, Missouri.

THIRD ANNUAL SYMPOSIUM OF SYSTEMATICS

On October 26th and 27th the third annual symposium on problems of Systematics (the scientific classification of plants and animals) was staged by the Garden and the Henry Shaw School of Botany, with generous financial help and moral support from the National Science Foundation. Visitors (136 in all) arrived by plane, train, and motor car. The bulk of them were from the Middle West but some came from as far as the New York Botanical Garden, the University of Colorado and Baton Rouge, Louisiana. All were interested in basic problems connected with the classification of plants and animals; they came from universities, colleges, museums, botanical gardens, natural history surveys. Some (about a third) were technically zoologists, the rest were mostly botanists. Not quite half of them were graduate students just starting out on a technical career, a few were amateurs, the remainder were teachers and staff members, several of them scholars with international reputations.

Now that the continued encouragement and development of science are becoming of real national concern, support for the scientific work which goes on at such independently endowed centers as the Garden is growing from year to year in various ways. With its outstanding herbarium and fine library (both of them begun by Henry Shaw) the Garden makes an ideal place for informal get-togethers of this sort. Many of those attending this conference arrived a day or two early or stayed over the following Sunday in order to make full use of the herbarium and library. Sessions were held in the old Museum built by Mr. Shaw, now so popular as a meeting place for plant-minded groups that it averages one meeting a day during some months.

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SOME FACTS ABOUT SHAW'S GARDEN

The Missouri Botanical Garden (the official name chosen by Mr. Shaw) carries on the garden established by Henry Shaw over a century ago at TOWER GROVE, his country home. It is a private institution and has no support from city or state. The old stone walls and cast-iron fences, the Linnaean House, the Museum, the Mausoleum, and the TOWER GROVE mansion all date from Mr. Shaw's time. Since his death, as directed in his will, the Garden has been in the hands of a Board of Trustees who appoint the Director.

The Garden is open every day in the year (except New Year's and Christmas) from nine A. M. until seven P. M. (spring to fall) and until six (in the winter time) though the greenhouses close at five. TOWER GROVE, itself, Mr. Shaw's old country home, is open from one until four, admission twenty-five cents, with special guides. The Garden is nearly a mile long and has several entrances. The Main Entrance, the one most used by the general public, is at Tower Grove and Flora Place on the Sarah bus line (No. 42). The Park Southhampton buses (No. 80), direct from downtown, pass within three blocks of this entrance and stop directly across the street from the Administration Building at 2315 Tower Grove Avenue. The latter is the best entrance for students, visiting scientists, etc. It is open to such visitors after 8:30 A. M., but is closed on Saturdays, Sundays, and holidays. The step-in gate (more or less concealed by the big Cleveland Ave. gate, 2221 Tower Grove) is nearly always open, and there is a service entrance on Alfred Avenue, one block south of Shaw Avenue.

Since Mr. Shaw's time an Arboretum has been developed at Gray Summit, Mo., adjacent to State Highways 50 and 66. It is open every day in the year and has two miles of auto roads as well as foot trails through the wild-flower reservation. There is a pinetum and an extensive display of daffodils and other narcissi from March to early May.

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